

TRANSACTIONS OF THE SECTION ON GENERAL SURGERY OF THE COLLEGE OF PHYSICIANS OF PHILADELPHIA.

Stated Meeting, April 14, 1899.

EDWARD MARTIN, M.D., in the Chair.

SURGICAL USES OF THE X-RAY.

LANTERN slides illustrating the value of the X-ray in locating foreign bodies were shown by DR. A. C. BUCKLEY.

DR. F. T. STEWART presented two slides showing greenstick fractures (Figs. 1 and 2). Fig. 1 is that of a greenstick fracture of the femur in a child two and one-half years of age. The line of fracture, unlike most greenstick fractures, looks as if it had been



FIG. 1.—Greenstick fracture of the femur (Pennsylvania Hospital).

made with an osteotome. In the typical greenstick fracture the line of cleavage resembles a T or Y, the bony tissue parting first on the convex side of the bending bone, then splitting longitudinally upward and downward. This is more clearly shown in Fig. 2, an incomplete fracture of the ulna with a curving of the radius. This patient was also two and one-half years of age. Both these fractures were completed by the surgeon, the bones straightened, and splints adjusted.

DR. CHARLES LEONARD presented slides showing renal calculi, and read a paper on the subject, for which see page 163.

DR. WILLIAM W. KEEN showed the calculus which he had removed from the case in which the calculus had been demonstrated by the skiagraph of Dr. Leonard. In continuation, he said:

There are two points of view from which we can regard the question of calculus: first, that of diagnosis; and, second, that of treatment. In the matter of diagnosis, it replaces an uncertain guess by positive diagnosis. It has happened to me three times to cut down on a kidney which I supposed contained calculi, to open the kidney, and to find no calculus. Hereafter I shall not make such a surgical blunder,—a blunder which was pardonable a few years ago, before we had the use of the X-rays, but is now inexcusable in surgical centres with X-ray apparatus.

The very remarkable slide that Dr. Leonard showed of one large

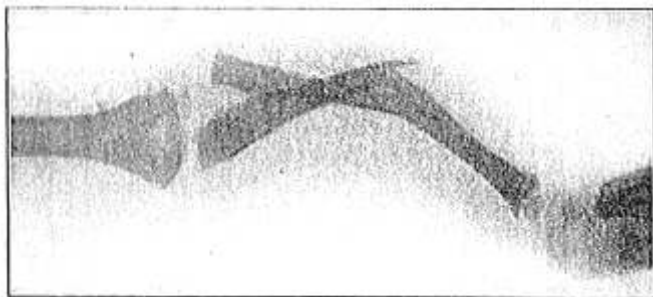


FIG. 2.—Greenstick fracture of the bones of the forearm (Pennsylvania Hospital, F. T. Stewart).

calculus and two smaller ones is an illustration of the ability of the skiagrapher at the present time to show not only that the calculus is present, but the exact number and location of calculi, so that when we have removed one calculus it will not be supposed that we have removed all that are present; but we can refer to our picture and determine whether there are others present.

We are not only able to diagnosticate the presence of calculi, but the exact position can be determined. In other words, the kidney having been exposed, and practically in our hands, we can fix the level in the kidney at which the stone exists by referring to the spines of the lumbar vertebræ, as shown in the skiagraph. In this manner we are saved unnecessary mutilation of a kidney, and of making a much larger opening than is necessary, involving the question of more

hæmorrhage. As hæmorrhage is always a serious matter, we should limit ourselves to as small an incision as practicable.

One other word as to stone in the bladder. Dr. A. H. Cordier showed to me some remarkable pictures taken, not of actual pathological specimens, but of stones purposely introduced into the bladder, by a method which is very suggestive. He took narrow slides, somewhat of the shape of microscopic slides, covered with paper or other material for the purpose of preventing any possible absorption of poisonous matter, and introduced this narrow slide into the vagina in women, or into the rectum in men. Then placing the X-ray tube

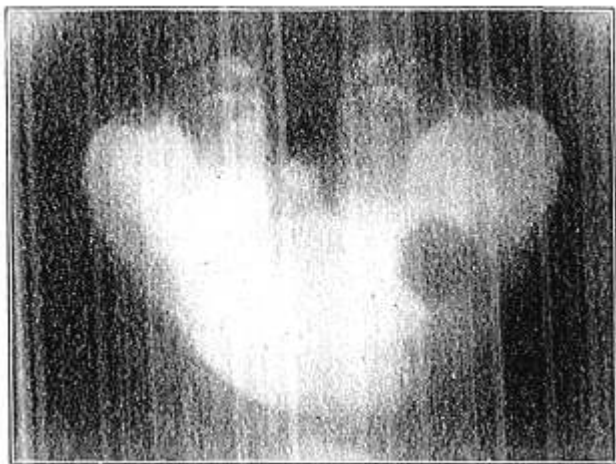


FIG. 3.—Dr. J. William White's case of vesical calculus.

above the pelvis, he was able to skiagraph absolutely and with the utmost correctness a stone in the bladder in either sex.

So we are not dependent now on the possibility of taking the skiagraph through bones, but can take them independently of the bones by the exposure of small narrow plates. The X-ray makes us certain of the presence of the stone and of its location. Even though encysted, we may be sure of its presence, though we may have failed to find it at previous attempts.

One other important point is that it requires an expert to interpret these pictures. I am sure that many who are not such experts

would not be able to define the outline of the kidney until it was pointed out, and in some of the pictures of calculi would not be able to be sure that they were calculi. Especially do I call attention to this need of expert interpretation of X-ray pictures in connection with medico-legal cases. In many cases an X-ray picture shown to an untutored jury is not only throwing away time, but serious damage may be done by their misunderstanding it.

SKIAGRAPHY IN ORTHOPÆDIC SURGERY.

DR. GWILYM G. DAVIS said that while the extravagant hopes raised by the discovery of the marvellous properties of the Röntgen rays have in many cases failed of realization, still, in the field of orthopædic surgery, their value has been amply demonstrated, even though as yet we have only begun to unfold their benefits. Orthopædics treats of the bones and joints, and it is in demonstrating the conditions of these structures that skiagraphy has shown its greatest efficiency. It will suffice to point out a few of the ways in which it can be utilized. Changes in the shape of the bones are most clearly shown. We are enabled not only to get a perfect picture of the normal bones *in situ*, but also of bones more or less distorted or diseased. Thus, in rickets, in which the bones assume the most varied shapes, we are able to get a most accurate outline of them, no matter how much they are concealed by the soft parts. In cases of bow-legs and knock-knees, we are able to see the exact factors which produce the distortion, and decide as to the best point to attack them. Our knowledge of that recently-described affection, coxa vara, is largely due to the information obtained as to the condition and position of the head and neck of the femur of the affected limb,—knowledge, too, which has had a direct bearing on the therapeutic procedures employed for its relief.

Skiagraphy has demonstrated quite satisfactorily various deformities of the ribs, particularly cases of cervical ribs, and has cleared up the diagnosis of obscure swellings in that region. Not only have the deformities due to disease been made visible, but also those due to injury. The general surgeon sees fractures in their recent state, but it is to the orthopædic surgeon that the deformities arising therefrom apply for relief. Here the utility of skiagraphy is evident. It shows the exact site and often the essential nature of the deformity, and renders clear the course to be taken to relieve it. In cases of congenital bony defects the exact extent of the lesion is rendered visible, and one is able to see how much of the normal bone is lacking.

By skiagraphy we are also enabled to ascertain the relative position of the bones, particularly those entering into the formation of the joints. By its means, Lovett and Cotton were able to demonstrate the altered positions assumed by the bones in standing, in cases of painful pronation of the foot.

In congenital luxations of the hip, we are enabled to see the actual relation of the head of the femur to the acetabulum. It tells us to what extent it is present, when it is out of joint, and when it is again in place. Its use in this affection is almost imperative.

In cases of luxation of bones, its demonstration of the lesion is perfect. By its means, on one occasion, I was enabled to show that a painful affection of one of the toes of the foot was due to a displaced phalanx, and afterwards to again demonstrate its replacement. In ankylosis, it enables us to distinguish between a bony and fibrous bond of union, and regulate our treatment accordingly. In cases of exostosis, we are not only enabled to see their shape, but also their mode of attachment. In diseases of the bones entering into the formation of joints, their extent is often well defined. In coxalgia this is particularly the case, the loss of the head of the bone from caries being made quite evident. The same is true to a less extent, perhaps, when the disease attacks other joints. In club-foot, the distortion of the bones is made manifest, and one of the most valuable and suggestive of its revelations is the small part played by the true calcified bone, and the large part played by simple cartilaginous and fibrous changes, thus teaching us that operations on the bones are only essential comparatively late in life. It is most satisfactory to be able to practically see, after an operation for deformity from fracture, that the bones have been correctly replaced. Also in resection of the knee-joint, a skiagraph will show whether or not the sawn ends of the bones have remained in proper position. Subsequent displacements may be recognized, and therefore capable of being rectified.

Inasmuch as the larger part of orthopædic affections involves the extremities, skiagraphy has proven a most valuable aid. In affections of the spinal column, while certain results have been obtained particularly in the cervical region, they have not been so valuable as have those of the extremities. So essential has the use of the method become in orthopædic surgery, not only for diagnosis, but, above all, for treatment, that an X-ray outfit has now been installed in most of the orthopædic hospitals, and we may confidently look for valuable additions to our knowledge in the near future.